REMARKS

Claims 1-19 and 21-67 are all the claims pending in the application. Claims 1-3, 10-12, 21-23, 36, 38, 40-42, 48, 51, 52, and 67 have been examined. Reconsideration and allowance of all claims are respectfully requested in view of the following.

Claim Objections

The Examiner objected to claims 21-23 because they depend upon claim 20 which has been cancelled. Applicants have amended claims 21-24 (claim 24 also was depending from claim 20) to depend from claim 1 to correct this informality. Applicants thank the Examiner for examining these claims as if they had depended from claim 1. Applicants also request that this after-final amendment be entered because it does not raise any new issues and it places the application in better condition for appeal.

Claim Rejections

The Examiner rejected claims 1-3, 10, 21, 36, 40-42, 48, 51-52/1-3, 51-52/10, 51-52/48, and 67 under §102(b) as being anticipated by Hashizumi et al. (EP 0 786 345; hereinafter "Hashizumi") and further supported by Kawasaki et al. (US 5631463; hereinafter "Kawasaki") under MPEP 2131.01 to show inherence. Applicant respectfully traverses this rejection for at least the reasons set out below.

Applicants submit that the combination of Hashizumi supported by Kawasaki fails to disclose, at least, wherein the lower electrode includes a tensile stress, as recited in independent claim 1.

Under this rejection, the Examiner alleges that Hashizumi teaches most of the elements of independent claim 1. However, the Examiner correctly concedes that Hashizumi is silent as to whether the lower electrode includes a pre-established compressive stress and a tensile stress.[1] In order to compensate for this deficiency, the Examiner applies Kawasaki, alleging it teaches that an internal stress is inherent within the disclosure of Hashizumi. The Examiner's logic is summarized as follows: (1) Hishizumi teaches that the lower BE electrode made of Pt is heat treated; (2) Kawasaki teaches that a Pt electrode has a large compression stress after the piezoelectric film formation and has a low internal stress such as a tensile stress after heat treatment; and (3) therefore Hashizumi's heat treated Pt lower BE electrode must also have a low internal stress.

Applicants respectfully submit that the Examiner's logic fails in two respects: (1) the Examiner has stretched the teachings of Kawasaki to cover all Pt electrodes formed; and (2) the Examiner has ignored objective scientific evidence supplied in previous responses by Applicants.

As an initial matter, the Examiner appears to use Figure 3 of Kawasaki to stand for the proposition that a heat treated Pt electrode must have a low internal stress such as a tensile stress. However, the graph in Figure 3 is at odds with the full disclosure of Kawasaki. In Figure 3, the graph shows specific internal stresses (y-axis) of thin films (Pt, Pd, Au) at various levels of heat treatment (x-axis). Applicant notes that no specific forming methods, film thicknesses or substrate structures are associated with the thin metal used in this graph. To the contrary,

[1] Office Action at page 3, 3rd full paragraph.

Kawasaki only discloses that Figure 3 shows the dependence of internal stress in metal thin films: no other qualifying properties are mentioned.

Furthermore, Kawasaki discloses the importance of the thickness and nature of the different materials bonded in controlling the internal stress.[2] Because of the importance Kawasaki gives to these criteria (thickness and structure), it is erroneous for the Examiner to interpret the graph of Figure 3 to stand for the proposition that all heat treated Pt electrodes have an internal tensile stress. For example, Figure 3 shows that the Pt has a slight internal tensile stress after heat treatment at 200° C, but after heat treatment to only about 175° C the stress remains compressive. If the thickness and the nature of the materials are changed, this stress may not reach the tensile stage and may remain compressive, as Kawasaki teaches that these criteria impact the internal stress. Thus, Applicants submit that the Examiner is reading Figure 3 to apply to all heat treated Pt electrodes counter to the full disclosure of Kawasaki.

Secondly, Applicants submit that the Examiner applies Figure 3 despite having knowledge of the thorough technical analysis contained in the Spierings et al. article published in the Journal of Applied Physics as disclosed in Applicants' response dated August 29, 2005.[3] This article clearly shows that a Pt film, before heat treatment, can possibly exhibit either a

[2] *See* Kawasaki, column 2, lines 37-38 and 45-48.

[3] G.A.C.M Spierings et al., *Stresses in Pt/Pb(ZrTi)O$_3$/Pt Thin-film Stacks forIntegrated Ferroelectric Capacitors*, JOURNAL OF APPLIED PHYSICS, VOL. 78(3), August 1, 1995, pp. 1926-1933.

tensile or a compressive stress, depending on the forming conditions.[4] Figure 3 of this article shows that using four different forming conditions, the Pt film formed may either have a residual compressive or a residual tensile stress when formed on a particular material. However, instead of taking heed of this knowledge, the Examiner chooses to rely on the graph of Kawasaki that entails no particulars about how or on what material the Pt layer was formed. Notwithstanding the foregoing, Kawasaki's Figure 3 itself shows that, dependent on heat treatment, the Pt electrode may have a stress ranging from compressive, to non-existent, to tensile. That is, Kawasaki's Pt line crosses "0" stress.

Thus, Applicants submit that while the aforementioned references teach that there is a possibility that a heat treated Pt electrode may have an internal tensile stress, the Examiner has failed to prove inherency. In order to prove inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present and that is would be recognized by one of ordinary skill in the art.[5] Further, "[t]he mere fact that a certain thing may result from a given set of circumstances is not sufficient."[6] Thus, because the Pt electrode of Hashizumi - even as evidenced by Kawasaki - may have a compressive, tensile, or no internal stress, it does not inherently, i.e., necessarily, have an internal tensile stress. Therefore, Applicants submit that Kawasaki fails to show the inherency of an internal stress of the Pt electrode in Hashizumi.

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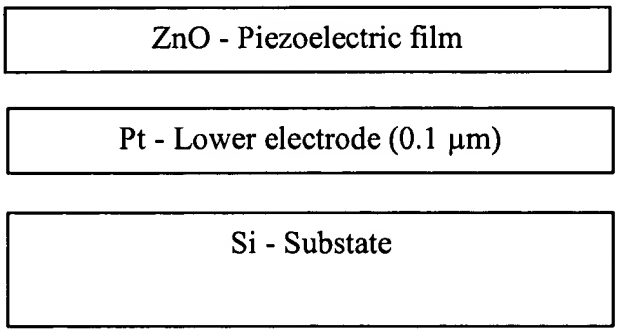
[4] *See Id.* at pp. 1928, Figure 3.

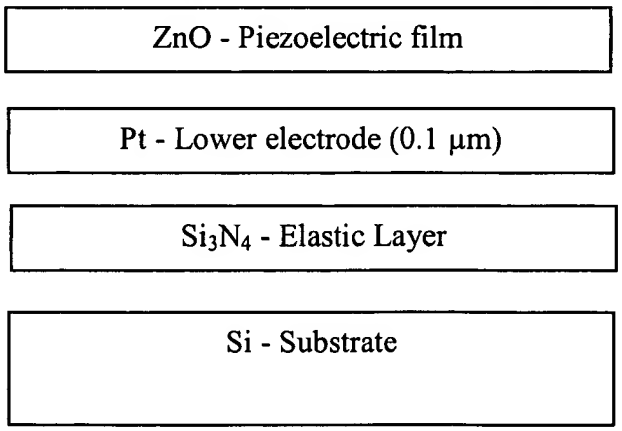
[5] In re Robertson, 169 F.3d 743, 745 (Fed. Cir. 1999).

[6] *Id.*

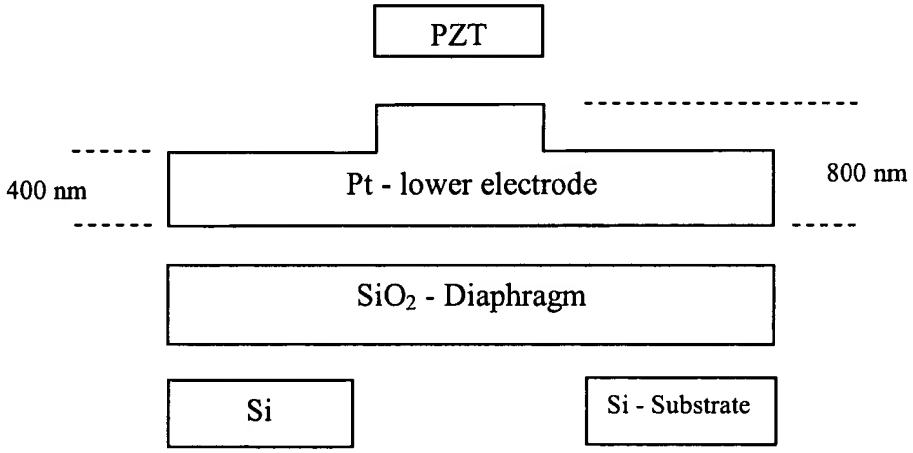
In addition, the structures in examples of Kawasaki are different from that of Fig. 12 of Hashizumi. The differences are at least as follows. In example 1 in Kawasaki (see, column 6, lines 36-57), as shown in the following figure, a lower electrode formed from Pt is provided on a substrate, and a piezoelectric film is provided on the lower electrode. The piezoelectric film is formed from ZnO and the thickness of the lower electrode is 0.1 μm.



In example 4 in Kawasaki (see, column 9, lines 25-34), as shown in the following figure, an elastic film formed from Si_3N_4 is provided on a Si substrate, and a lower electrode formed from Pt is provided on the elastic film. Further, a piezoelectric film formed from ZnO is provided on the lower electrode. The thickness of the lower electrode is 0.1 μm.



On the other hand, in Fig. 12 in Hashizumi, as shown in the following figure, a diaphragm formed from silicon oxide is provided on a Si substrate, and a lower electrode formed from Pt is provided on the diaphragm. Further, a piezoelectric film formed from PZT is provided on the lower electrode. In the lower electrode, the thickness of the area attached to the piezoelectric film is 800 nm and the thickness of the area not attached to the piezoelectric film is 400 nm.



As can be seen from the above, Kawasaki and Hashizumi are different from each other in the thickness of the lower electrode and in the materials of the upper and lower layers of the lower electrode. Accordingly, even if Kawasaki is used, the Pt electrode of Hashizumi may have a compressive or tensile stress, but not necessarily an internal stress. Therefore, there is no inherency.

The Examiner rejected claim 11-12, 51/11-12, 52/11-12 under 35 U.S.C. § 103 (a) as being unpatentable over Hashizumi supported by Kawasaki in view of Ichikawa. This

combination fails to make up the deficiency noted above with regard to the inherency of an internal tensile stress. Thus, this rejection is respectfully traversed.

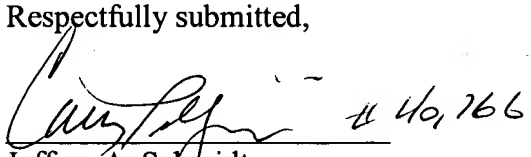
For at least the reasons noted above, Hashizumi supported by Kawasaki fails to anticipate Applicants' independent claim 1. Likewise, claims 2, 3, 10-12, 21-23, 36, 38, 40-42, 48, 51, 52 and 67 are patentable, at least by virtue of their dependency.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Jeffrey A. Schmidt
Registration No. 41,574

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

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